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# TRAFFIC ENGINEERING BRANCH

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## ANNUAL REPORT 1988

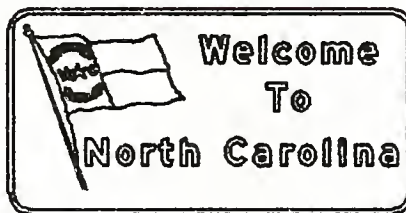
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BICYCLING HIGHWAYS



MOUNTAINS TO SEA

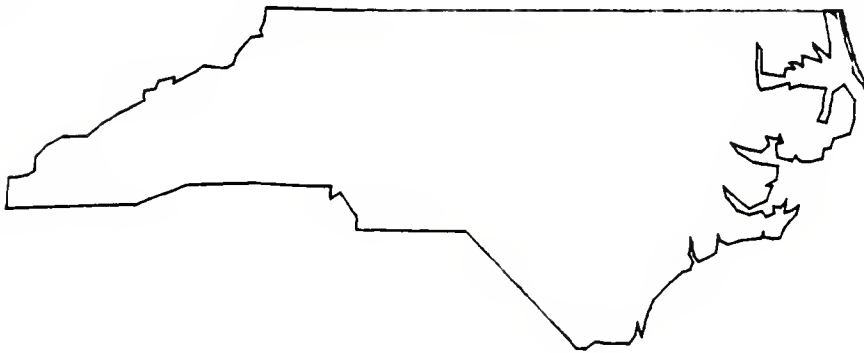


# DIVISION OF HIGHWAYS




# **TRAFFIC ENGINEERING BRANCH**

**1988  
ANNUAL REPORT**



**DIVISION OF HIGHWAYS  
DEPARTMENT OF TRANSPORTATION**

**PREPARED BY: TRAFFIC STUDIES UNIT**



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### **ACKNOWLEDGMENTS**

The Traffic Engineering Branch wishes to express its gratitude for the cooperation and help of all the branches in the Division of Highways that contributed to our efforts in 1988.

We also would like to recognize the agencies outside of the Division of Highways who helped to make our accomplishments possible. Some of these are:

- The Federal Highway Administration
- The Governor's Highway Safety Program
- The Division of Motor Vehicles (particularly the Traffic Records Section)
- The Highway Patrol Division
- The UNC Highway Safety Research Center

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# INTRODUCTION

The Traffic Engineering Branch's accomplishments for 1988 emphasize the diversity of work required to meet the needs of all who use State road facilities.

The work performed is presented by unit, with professional activities listed alone. To indicate the role played by the 14 Highway Divisions throughout the State, the activities of the Division Traffic Services Units are also indicated. Activities for the year are enumerated wherever practical. Such figures, however, often represent only the results of extensive preparation and ground work, factors not easily quantified.

This Annual Report is intended to serve two purposes:

1. To furnish State Highway officials and others, information on the annual work of the Branch.
2. To explain the functions of the Branch to trainees, new employees, and other groups interested in the safe, efficient control of traffic on the streets of North Carolina.

# ORGANIZATION AND RESPONSIBILITIES

The Traffic Engineering Branch, which is staffed to the Assistant State Highway Administrator of the Division of Highways, is responsible for safe and efficient traffic operations on the State Highway System - a system that consists of 12,207 miles of Interstate and rural primary US and NC numbered routes; 59,312 miles of rural secondary routes; and 3,140 miles of urban routes, for a total of 76,582 miles.

Some of the specific duties of the Branch are as follows:

1. Development of policies for the use of pavement markings, signalization, channelization, driveway and street entrances, medians, speed zones, highway routing, and parking regulations.
2. Preparation of geometric and traffic signalization designs to improve the safety and traffic capacity at problem locations, and to establish optimum traffic signal timing.
3. Analysis of types of accidents, accident severity, and locations having high accident frequency, in order to reduce these factors, and relieve traffic congestion.
4. Development and implementation of various traffic safety programs including Federal Highway Safety Programs and Projects as they apply to the State of North Carolina.
5. Development and maintenance of uniform policies for the traffic engineering work performed by the 14 Division Traffic Services Units.
6. Investigation of requests, complaints, and suggestions for traffic operations and safety improvements.
7. Preparation of traffic control plans to ensure traffic safety for all construction projects.
8. Provision of technical advice and assistance to municipal officials and local governing bodies, upon request.
9. Management of funds used for the historical marker program on state roads in cooperation with the Department of Archives and History.



There are 129 positions in the Traffic Engineering Branch as shown on the organization chart on page 5: 63 traffic engineers, 46 engineering technicians, 1 traffic control shop supervisor, 9 electronic technicians, 1 statistical research assistant, 1 administrative secretary and a staff of 8 clerical support personnel.

The Traffic Engineering Branch is organized into two major functions: Field Operations and Technical Operations. These functions are designed to provide a centralized, technical policy-making and design staff (based in Raleigh) and a field traffic engineering staff to implement statewide programs. The following is a brief description of the work done in these areas:

#### TECHNICAL OPERATIONS

TECHNICAL OPERATIONS GROUP is a centralized design, technical, and administrative group which provides traffic engineering plans for construction of improvements, promotes uniform traffic engineering practices standards, and policies statewide, and provides administrative services. This Group is subdivided into three units and a stenographic pool, as shown below.

The Traffic Control Unit prepares traffic control plans for contract construction and maintenance projects involving construction phasing, construction methods, and traffic control devices to safely and efficiently handle traffic in work zones. This unit is also responsible for pavement marking.

The Signals and Geometrics Unit prepares traffic and geometric design plans for Spot Safety improvements and traffic signal designs for contract installation. This unit also coordinates the preparation of agreements and plans for the installation of railroad-grade crossing signals.

The Signing Unit prepares sign design plans (including sign lighting) for contract construction projects, and reviews requisitions for signs and sign materials installed by Division Traffic Services.

The Stenographic Pool is responsible for all clerical and centralized word processing for the Branch. The Pool is also responsible for processing purchase requisitions, securing assistance in maintaining equipment, maintaining office supply inventories, and maintaining the central files.

## FIELD OPERATIONS

FIELD OPERATIONS consists of a Raleigh Office Signals Management Unit, Traffic Studies Unit, five Area Traffic Engineering Units located in Wilson, Durham, Fayetteville, Winston-Salem, and Asheville, and a Field Support Squad.

The Signals Management Unit optimizes the timing and operation of traffic signals and signal systems, and prepares traffic signal specifications. This unit also is involved in the inspection of traffic signal and railroad crossing signal installations. This unit also operates a signal repair shop located in Raleigh.

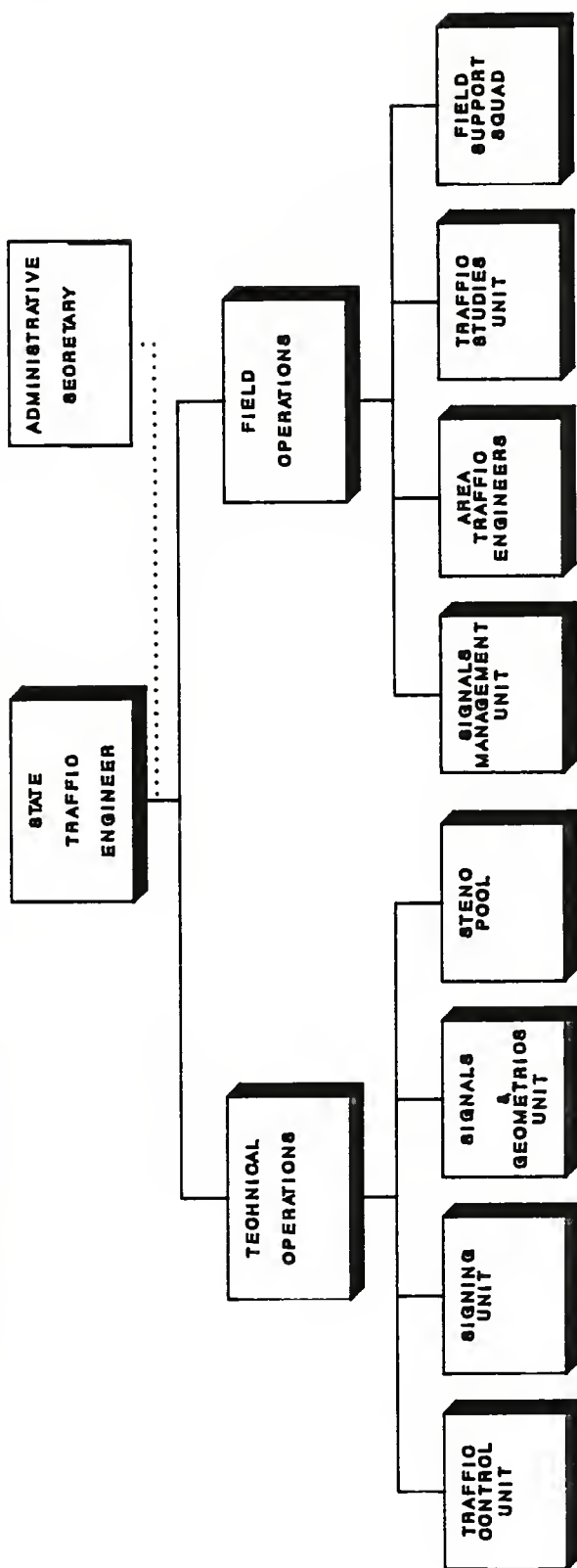
The Traffic Studies Unit serves as a liaison between the field units, the technical operations function, other branches within the Division of Highways, various state and federal agencies and the public in general. This unit reviews roadway plans in the preliminary and advanced stages of design; and reviews driveway permits for major traffic generating locations. Other duties include performing special traffic engineering projects, conducting evaluations on traffic control devices, maintaining the branch technical library, coordinating technical meetings and training activities, and publishing technical materials.

Each Area Traffic Engineering Unit has two traffic engineers who investigate and recommend improvements at locations on the State Highway System which are experiencing traffic operational and safety problems, including locations identified on the various Highway Safety programs. The five Area Traffic Engineers work closely with the 14 Division Traffic Engineers located throughout the State (see map, page 6, "Area Traffic Engineering Unit Area Assignments"), providing technical advice, interpretation of policy, and technical assistance.

The Field Support Squad provides administrative staff engineering assistance to the Assistant State Traffic Engineer (Field Operations) in carrying out the functions of Field Operations and serves as a liaison between Field Traffic Engineers and the Raleigh office.

# TRAFFIC ENGINEERING BRANCH

## NC DEPARTMENT OF TRANSPORTATION



## ORGANIZATION CHART

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
TRAFFIC ENGINEERING BRANCH  
AREA ASSIGNMENTS



NORTH CAROLINA

AREA OUTLINE MAP

AREA	OFFICE	DIVISIONS
1	WILSON	1,2,4
2	DURHAM	5,7
3	FAYETTEVILLE	3,6,8
4	WINSTON - SALEM	9,10,11
5	ASHEVILLE	12,13,14

# **TECHNICAL OPERATIONS**

Winston - Salem

## TECHNICAL OPERATIONS GROUP

Technical Operations Group is managed by the Assistant State Traffic Engineer (Technical Operations), the group consists of three Units and a Stenographic Pool as shown below.

1. Traffic Control Unit
2. Signals and Geometrics Unit
3. Signing Unit
4. Stenographic Pool

They are all located in the Traffic Engineering building in Raleigh. The Units are responsible for developing preconstruction traffic engineering designs plans, specifications, standards, and engineering estimates for highway projects. This involves the use of all traffic control devices including work zone traffic control. The Stenographic Pool is responsible for all clerical and centralized word processing for the Branch. The Pool is also responsible for purchase requisitions, securing assistance in maintaining equipment, office supply inventories, payroll, and maintaining the central files. A detailed description of each unit and their accomplishments during 1988 follows. Activities for each unit are also enumerated for the years 1984-1988. The activity charts show semi-annual quantities as well as annual totals where practical.



# TRAFFIC CONTROL UNIT

## Purpose:

This unit was formed in the late 1970's in direct response to Federal Highway Notice N-5000.7, which requires all highway construction projects involving Federal Highway Funds have a Traffic Control Plan (TCP) to protect workers and safely guide motorists thru a roadway construction workzone. As an extension of this directive, the North Carolina Department of Transportation also requires a TCP plan for all State-Funded roadway construction projects. Secondary responsibilities of the Traffic Control Unit include developing Roadway Pavement Marking and Delineation plans for all Federally and State Funded roadway construction projects to safely guide motorists along the North Carolina system; providing guidance, standards, and policies on Traffic Control, Roadway Pavement Marking, and Delineation Plans to all other branches of the Division of Highways, Departments of State Government, Municipalities, Utility Companies, and private engineering firms pertaining to any work being performed in the highway right-of-way.

## Personnel:

This unit consists of the following personnel complement:

One Traffic Control Engineer	- (HE III)
Three Traffic Control Project Engineers	- (HE II)
Six Traffic Control Design Engineers	- (HE I)
Twelve Traffic Control Design Technicians	- (ET III)
Four Traffic Control Technicians	- (ET II)

## Organization Changes:

No changes

## Activities:

In 1988, the Traffic Control Unit prepared 162 traffic control plans and completed revisions to 49 plans after letting to contract. The Traffic Control Unit attended 103 field inspections and 87 related project construction meetings.

## Special assignments completed over the past year:

### Developed:

... Traffic Pattern Switches Specification for coordination of traffic pattern switches with all concerned parties prior to the switch process. Included in TCP plan for



following projects: R-211EN, R-58BC (Division 12); U-2004 (Division 10); I-2204 (Division 5); R-84B (Division 4); B-900 (Division 1).

- ... Formed a Performance Appraisal Review (PAR) task force to develop employee performance appraisal system to replace present WPPR to meet implementation date of July 1, 1989.
- ... Revised Temporary Concrete Barrier and Type "S" Barrier Specifications to include cotter pin to be furnished and installed by Contractor.
- ... Large Bead Thermoplastic Pavement Marking Specification.
- ... Signs on Barricades Specification.
- ... Temporary Sectional Glare Screen Specification and typical for installation on I-301D (Mecklenburg County).
- ... Currently in the process of revising resurfacing and marking packages to replace the outdated packages which will decrease present preparation time.
- ... Currently writing Portable Traffic Signal Specification to be used on construction projects in lieu of flaggers.
- ... In the process of entering all TIP, production and spot safety projects on the CICS HY program "Project Status Reports" which provides access of Traffic Engineering Branch information on specific projects to various DOT departments.
- ... Set up a Roadway Standards and Typicals task force to review existing roadway standards and traffic control typicals to update existing policies and standards.
- ... Variable message matrix signs specification for signs (with capacity of message change by cellular phone) purchased by Division to be placed at each end of the I-40 project, I-2204, at Research Triangle Park for public information on progression of project. This highly publicized project also implemented other concepts including the purchase of cellular phones to increase communication capabilities. Extensive use is being made of all forms of media, including printing of 100,000 brochures with a map, general project staging and the Resident Engineer's office number as a project "Hotline" number. Alternate routes have been determined, publicized, and some improvements made to them. Carpooling has been emphasized through Triangle Tri-A-Ride and a triangle bus service is being established.

#### Test Projects:

- ... Large bead thermoplastic pavement marking on all projects let with thermoplastic pavement marking from January 1988 to July 1988.
- ... Tested reflectivity using the Mirolux<sup>TM</sup> Reflectometer on I-2005 (Division 13)
- ... Began implementation to test pavement marking using thickness gauge measurement on several field reviews to verify that the pavement marking material placed matches the specification.
- ... Astro-Optics<sup>TM</sup> pavement markers placed on 4 lane section of NC 24 east of Fayetteville (Division 6).
- ... 5" edgeline and centerline on project X3BX/X3BY in Division 4, Sampson and Duplin Counties, to be measured with pavement marking thickness gauge supplied by Traffic Services for contractor use.

#### Filmed:

- ... B-2177 (Div. 5) New Hope Church Road, Premark<sup>TM</sup> application demonstration for heated-in-place<sup>TM</sup> preformed thermoplastic pavement marking.
- ... How to use reflectometer, structure removal and structure construction on I-2005 in Asheville (Division 13).
- ... Various construction operations performed on I-301EB at I-85 and Statesville Avenue in Mecklenberg County: grading, wedging, concrete median barrier placement, application of pavement marking, and traffic switch; to be implemented in traffic control training video for trainees and new employees.
- ... Project I-810, at I-40 and Old Fort Mountain (Division 13), use of asphalt island with tubular markers

#### Completed:

- ... Type "S" Barrier, previously a Structures item, is now the responsibility of the Traffic Control Unit. Revisions have been made to the specification, typical drawing and pay item.
- ... Reflectivity and Thickness Readings Procedures Manual.
- ... Snowplowable pavement markers are now being included on Resurfacing Contracts.

- ... A series of Traffic Control Unit Training classes to make all plan design concepts more consistent.
- ... Due to the manpower requirements exceeding our manpower availability, approximately twenty (20) projects were awarded to private engineering firms to prepare traffic engineering plans in 1988.
- ... Twelve (12) projects have been negotiated and are awaiting Board of Transportation approval for January and February 1989 boards for award to private engineering firms.

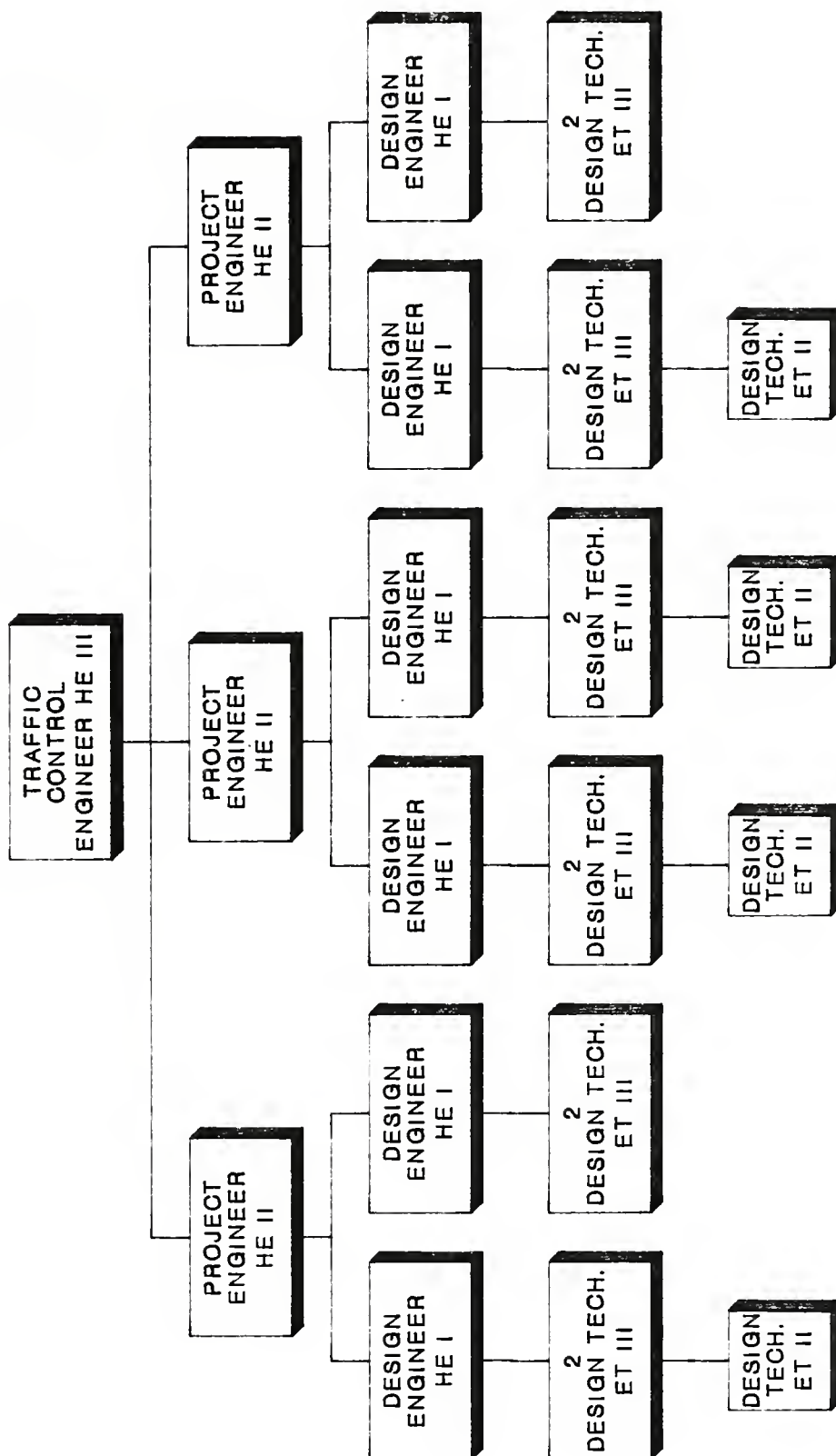
Computer Aided Drafting and Design (CADD):

- ... Our unit completed priority projects on the CADD when faced with immediate deadlines:
  - I-2204: The Alternate Route Map on the I-40 project at Research Triangle Park was designed for the brochures and posters as part of the public information plan.
  - I-2204A: This priority project, Westgate Road/ Aviation Parkway Intersection at US 70, was digitized and designed exclusively in this unit on the CADD. This was done as a "no roadway plan Traffic Control design" with the traffic control plan and signal plan handled exclusively by Traffic Engineering.
- ... Plan sheets of I-2005 were digitized on the CADD to show the limited sight distance along a curve on westbound I-240 at Merrimon Street bridge in Asheville. These drawings revealed that the minimum sight distance was not met around the curve and it cannot be met at the existing speed and degree of curve of the facility. By using the stopped/moving vehicle design model on the CADD, our calculations were substantiated.
- ... The Unit began placing roadway standard drawings, traffic control and pavement marking typicals on the CADD. A task force has been formed to review the existing drawings and update them to the existing policies and standards.

# TRAFFIC CONTROL UNITS ACTIVITIES

ACTIVITY DESCRIPTION	1984	1985	1986	1987	1988
1. TCP Design and Final Field Inspection Meetings	( 150)	( 103)	( 98)	( 97)	( 185)
2. Long-life Pavement Plans	( 24)	( 22)	( 22)	( 31)	( 40)
3. Snowplowable Pavement Plans	( 23)	( 13)	( 18)	( 29)	( 30)
4. Preconstruction & Constr. Conferences Attended	( 15)	( 21)	( 24)	( 30)	( 69)
5. Highway Construction Plans Reviewed	( 70)	( 94)	( 39)	( 53)	( 110)
6. Preparation of Traffic Control Plans for Construction Zones	( 146)	( 217)	( 157)	( 190)	( 211)
7. TCP Field Investigations	( 125)	( 65)	( 59)	( 67)	( 99)
8. Construction Reviews	( 28)	( 38)	( 72)	( 75)	( 42)
9. Pre-bid Conferences	( 2)	( 5)	( 7)	( 8)	( 12)

# TRAFFIC CONTROL UNIT



## ORGANIZATION CHART

# SIGNALS & GEOMETRICS UNIT

## Purpose:

The Signals and Geometrics Unit prepares plans, estimates, and specifications for the installation of traffic signals; prepares plans for modifying existing highway intersections; designs timing plans for coordinated signal systems using computer program software packages; and prepares and reviews plans and agreements for the installation of railroad grade crossing signals.

## Personnel:

The unit has a personnel complement of fourteen highway engineers and eleven engineering technicians. These are divided into six squads: two TIP Contract squads, one Spot Safety squad, one Urban Controller Upgrade squad, one System and Special Projects squad, and one Railway Signal-Traffic Signal Preemption squad.

## Organization Changes:

The single TIP Contract squad has been split into two separate squads.

## SIGNALS AND GEOMETRICS DESIGN SQUADS

### SPOT SAFETY SQUAD

#### Activities:

The Spot Safety Squad prepares traffic signal plans and intersection geometric designs. Requests for these designs come from two sources. The majority of the requests come from the monthly list of spot safety projects approved each month by the Board of Transportation. These projects are to be completed within 30 days of the Board's approval. Other requests come from field personnel.

The work involves doing stadia surveys, making base maps, doing final signal and/or geometric designs, preparing scratch requisitions, and cost estimates. Two and three signal systems are also done by this squad. In addition to doing designs, designs prepared by cities for locations on state system roads are reviewed for approval.



This squad currently consists of one HE II, one HE I, and two ET IIs. This squad may fluctuate in the number of members depending on the monthly spot safety work load dictated by the number of field and Board of Transportation requests.

#### TIP CONTRACT SQUADS

##### Activities:

The TIP Contract Squads are responsible for preparing the traffic signal plans that are to be included as part of TIP roadway projects.

There are three types of signal plans that are prepared depending on the agency who installs the signal. These include Contractor, Municipality or State Forces installations. Responsibilities for these type plans include: administration of the funding and scheduling of contract signal projects in the Transportation Improvement Program; designing contract signal installations; coordinating design details with various field personnel; preparing contract specifications; and reviewing and approving final plans, estimates and materials lists.

Two separate squads were formed in order to handle the tremendous work load dictated by the Transportation Improvement Program. All TIP projects are divided between the two squads equalizing the signal design work load. Presently, each squad consists of four employees; one HE II, one HE I, one ET III and one ET II. Coordination, planning and performance between both squads and various field personnel is very important in order to meet the high demand of new and improved signalized intersections.

#### SYSTEMS & SPECIAL PROJECTS SQUAD

##### Activities:

This squad is responsible for the preliminary engineering of traffic signal system plans, W-Project hazard elimination plans, spot safety traffic signal and geometric plans, and specialty traffic signal projects. This squad is also responsible for the development of CADD typicals for the Signals and Geometrics Unit as well as the administration of Engineering Agreements with private engineering firms.

Squad responsibilities include: design (and occasional field implementation) of traffic signal system timing plans; design of and preparation of scratch equipment lists for traffic signal plans for W-Projects in the TIP, traffic signal and geometric plans for W-Projects to be let by the Divisions, traffic signal and geometric plans for the Spot Safety program, and other specialty projects at the request of the

Divisions; CADD development to create typical drawings in order to greatly minimize the time required to prepare traffic signal plans for 2-Phase through 8-Phase designs; and developing and administering Engineering Agreements to be used by PEF's for the development of traffic signal plans.

The squad consists of one HE II, one HE I, one ET III and one ET II.

#### **CONTROLLER UPGRADE SQUAD**

##### Activities:

The Controller Upgrade Squad prepares plans and specifications for the replacement of existing traffic signal controllers and cabinets around the state. These projects are then bid on and awarded to a contractor.

The process of upgrading a controller begins with information being submitted from the field. The Controller Upgrade Squad then verifies this information against office records and reconciles any discrepancy. This insures the proper selection of the correct equipment for each location. The plans are then assembled and special provisions written.

The Controller Upgrade Squad is made up of one HE II, one HE I and one ET II. Coordination and communication are the key elements in the day-to-day operation of this squad.

#### **RAILWAY SIGNAL-TRAFFIC SIGNAL PREEMPTION SQUAD**

##### Activities:

This squad is responsible for the preliminary engineering of all railway-highway grade crossing signal projects and for the preparation of traffic signal plans and geometric designs involving traffic signal preemption.

Squad responsibilities include: Assist scheduling of railway-highway grade crossing signal projects in the Transportation Improvement Program; designing the proposed grade crossing signal installation; coordinating the detail design with the railroad companies involved; preparing the necessary contract specifications; reviewing and approving final plans, estimates and material lists; authorizing the railroad company to construct the railway-highway grade crossing signalization projects; and providing recommendations to those responsible for selecting railway-highway grade crossing projects.

Squad responsibilities also include: preparation of all traffic signal and geometric designs for projects involving preemptive phasing. Responsibilities for these type plans



include: Scheduling of contract signal projects in the Transportation Improvement Program; designing contract signal installations; coordinating design details with various field personnel; preparing contract specifications; and reviewing and approving final plans, estimates and materials lists.

In 1988 the Squad completed the preliminary engineering on and authorized construction of 51 projects. This total included 32 Federal-Aid Safety Program Railroad Grade Crossing projects and the railroad grade crossing signalization portions of 19 highway construction projects. Traffic signal designs were completed for 12 projects.

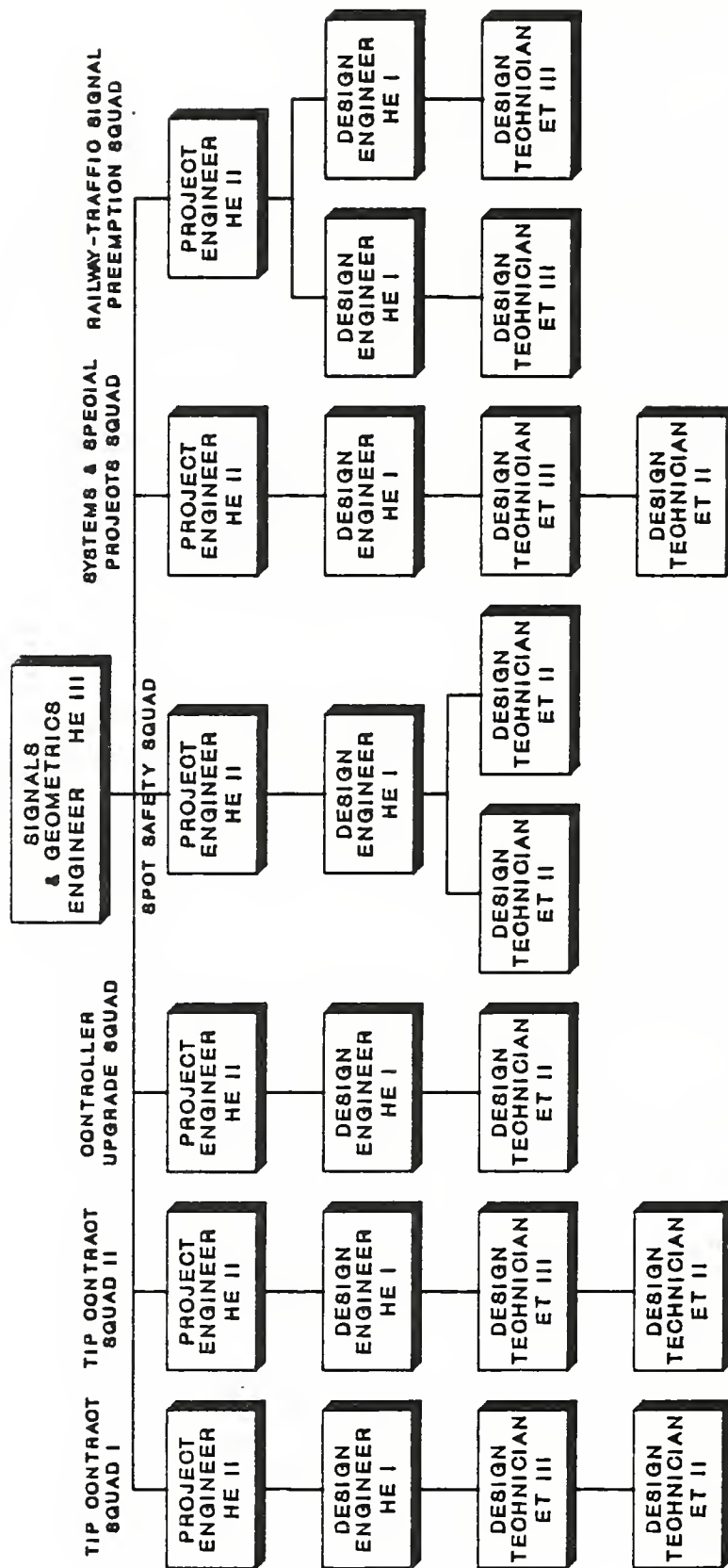
The squad consists of one HE II, two HE Is, and two ET IIIs.

#### SIGNALS AND GEOMETRICS UNIT

ACTIVITY  DESCRIPTION	1984		1985		1986		1987		1988	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUN	-DEC.	-JUN	-DEC.	-JUN	-DEC.	-JUN	-DEC.	-JUN	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
=====										
1. Signal (only) Designs		( 313)		( 388)		( 438)		( 357)		( 407)
2. Geometrics (only) Designs		( 78)		( 147)		( 44)		( 49)		( 14)
3. Geometrics/Signal Design		( 23)		( 12)		( 21)		( 29)		( 32)
4. Stadia Surveys		( 55)		( 74)		( 84)		( 73)		( 35)
5.Signal System Projects								( 83)		( 45)
6.Controller Replacement Project								( 393)		( 511)

# SIGNALS & GEOMETRICS UNIT

## 1988



## ORGANIZATION CHART

# SIGNING UNIT

## Purpose:

The Signing Unit designs and prepares detailed plans for signs and sign lighting; develops standard sign designs and maintains records on standard signs used by the Division of Highways; and designs and maintains signing standards for the use and placement of highway signs on the public roads and streets.

## Personnel:

The Unit consists of the following personnel complement:

1	Signing Engineer	-(HE III)
2	Signing Project Engineers	-(HE II)
3	Signing Design Engineers	-(HE I)
6	Signing Design Technicians	-(ET III)
1	Signing Technician	-(ET II).

## Organization Changes:

No position changes were made in 1988.

## Activities:

In 1988, the Unit had personnel microcomputers available for all permanent employees. Three additional computers arrived at the end of 1987 and were installed and integrated into the daily work of the Unit. All signs and ground-mounted supports are now computer designed; project cost estimates are prepared on the computers; and necessary project specifications are prepared using word processing software.

The Unit has full-time access to one Intergraph CADD work station. Employees have continued to design standard drawing cells which will be used to increase the speed of drawing project plans. In addition, user commands, tutorials, and specialized menus have been developed to greatly speed up the signing plan development on CADD. The impact of the CADD drafting and design system has increased the efficiency of the Unit in 1988, however, development of standard cell libraries and user tutorial programs have been much more time consuming than anticipated, slowing the Units' conversion to CADD produced plans. No software support has been available to the Unit or Branch from the CADD Group, and all development has taken place within the Unit. However, the groundwork is now in place to rapidly convert our drafting operations over to CADD.

The Unit is anticipating the acquisition of one additional workstation in 1989 which will allow for nearly all of the Units plans to be developed on the CADD system.

PS&E packages were prepared for signing projects while close communications were maintained with field personnel. The Signing Unit prepared plans for 52 signing projects over the past year and work continues on another 40 signing projects.

Some of the major tasks completed during the past year are as follows:

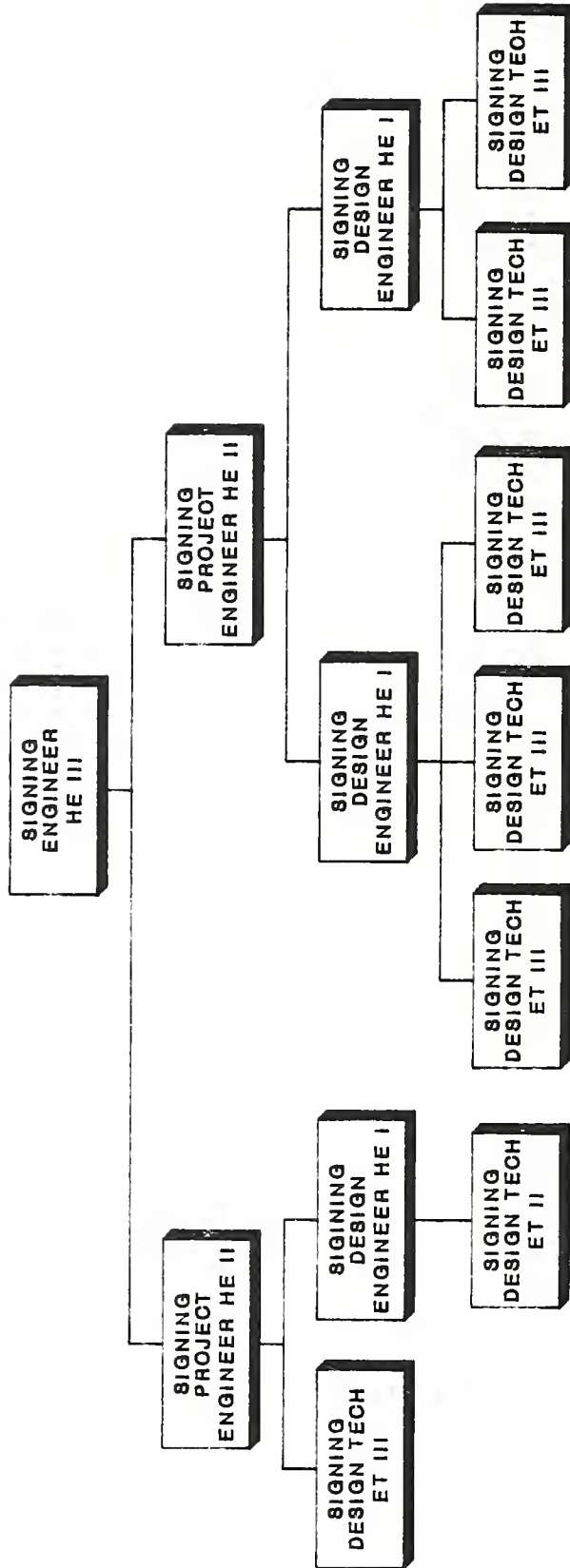
- . . . Over 2500 individual sign designs were completed for requests and on signing projects.
- . . . Developed and refined microcomputer applications to aid in the process of sign design, support designs, lighting design, and cost estimates.
- . . . Maintained computerized data bases for current signing projects and signing plans on file.
- . . . Developed and Installed several user commands, tutorials, and specialized menus for standard sign drafting on Intergraph CADD hardware.
- . . . Utilized Intergraph CADD work station to draw complete sets of signing plans for contract work as well as design diagrammatic signs, draw overhead sign structure cross-sections, and design special signing related items for contract signing plans prepared in the normal manner.

## SIGNING UNIT ACTIVITIES

ACTIVITY DESCRIPTION	1984		1985		1986		1987		1988	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUN.	-DEC.	-JUN.	-DEC.	-JUN.	-DEC.	-JUN.	-DEC.	-JUN.	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
1. Requisitions Processed **		( 441)		(**241)		( 205)		( 381)		( 225)
2. Number Signs Designed for Requisition & Others		( 432)		( 462)		( 731)		( 1079)		( 1025)
3. Number of Supports Designed for Requisitions & Others		( 57)		( 55)		( 28)		( 19)		( 20)
4. Full-Scale Drawings Completed		( 23)		( 17)		( 5)		( 15)		( 40)
5. Contract Projects Completed		( 20)		( 22)		( 16)		( 48)		( 52)
6. Contract Projects Incomplete		( 12)		( 9)		( 26)		( 50)		( 40)
7. Signs Sized & Layouts Made for Projects		( 789)		( 777)		( 411)		( 1519)		( 1570)
8. Number of Overhead Supports Designed		( 43)		( 45)		( 49)		( 58)		( 72)
9. Number of Overhead Lighting Systems Designed		( 39)		( 40)		( 46)		( 71)		( 79)
10. Projects for which Catalog Cuts Approved		( 7)		( 10)		( 11)		( 13)		( 11)
11. Catalog Cut Approval for Sign Lighting		( 16)		( 19)		( 12)		( 20)		( 15)
12. Contract Cost Estimates Made		( 50)		( 58)		( 18)		( 76)		( 73)
13. Contract Requisition Preparations		( 21)		( 15)		( 11)		( 32)		( 42)

\*\*Note: Requisitions for standard signs are no longer processed by the Signing Unit.

# SIGNING UNIT



## ORGANIZATION CHART

## STENOGRAPHIC POOL

### Purpose:

The Stenographic Pool is responsible for certain clerical and centralized word processing work for the Branch. The Pool is also responsible for processing all purchase requisitions, securing assistance in equipment, office inventories, and maintaining the central files.

### Personnel:

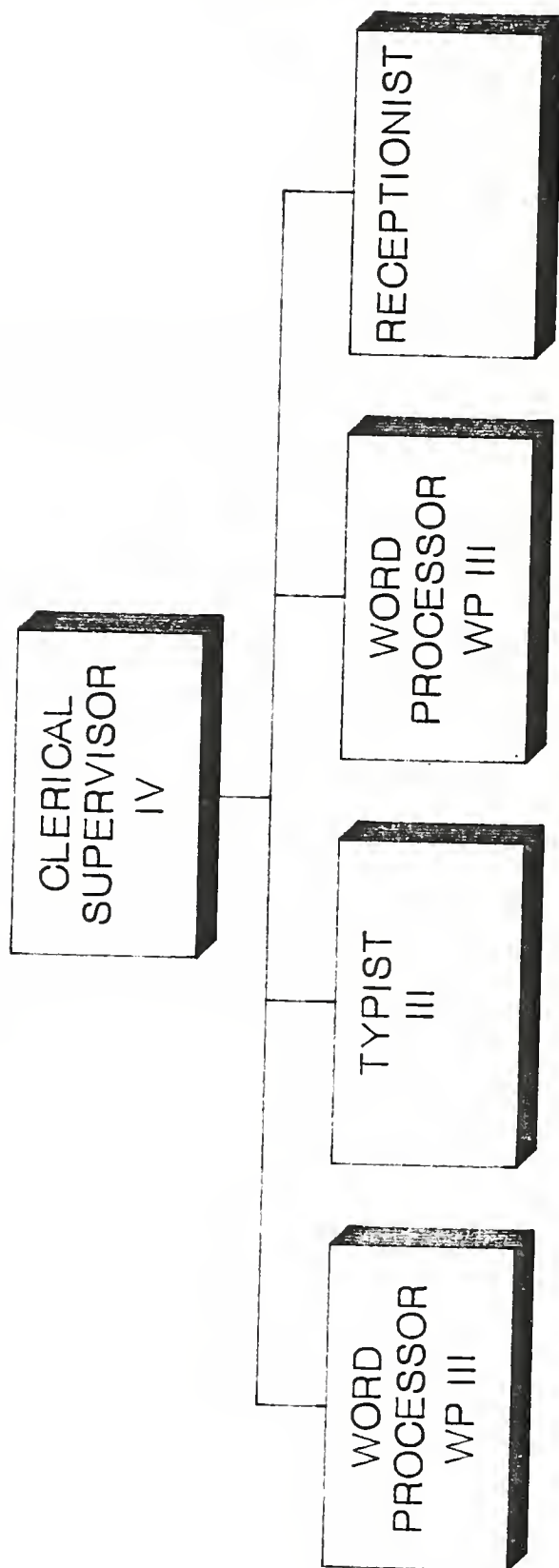
This Pool consists of one Clerical Supervisor IV, two Word Processor III's, and one Typist III, and Receptionist II.

### Activities:

This Pool performs various administrative duties, as shown below:

- ... Typing letters, memoranda, and reports.
- ... Filing and typing all purchase requisitions.
- ... Processing all requests for travel and travel advances; and helping employees with moving procedures, motor pool car requests, equipment rentals, workmen's compensation forms, job reports and payroll time, and office supplies.
- ... Serving as receptionist for the branch, with all calls coming through the central office.
- ... Maintaining the central files.

# STENOGRAPHIC POOL



## ORGANIZATION CHART



# **FIELD OPERATIONS**



### FIELD OPERATIONS GROUP

Field Operations is under the direction of the Assistant State Traffic Engineer - Field Operations, and consists of the following units:

1. Signals Management Unit
2. Traffic Studies Unit
3. Area Traffic Engineering Units (5 groups)
4. Field Support Squad

These units provide field traffic engineering services throughout the state. In accomplishing their duties, the staff is in frequent contact with public officials, citizens, and Division personnel. As a result they are in an excellent position to promote good public relations and an understanding of the Division of Highways' objectives on the local level.

Activities of the Signals Management Unit and the Traffic Studies Unit are enumerated for the years 1984-1988. Activities for each Area Traffic Engineering unit are enumerated for the year 1988.

# SIGNALS MANAGEMENT UNIT

## Purpose

The Signals Management Unit is responsible for the acquisition, application, installation, maintenance and optimization of traffic signal equipment installed on the highway system. The unit develops specifications, provides technical support and pursues an ongoing program of optimization of signals on the highway system.

## Personnel

Its personnel complement is as follows:

1 Signals Management Engineer	-(HE III)
1 Signal Systems Engineer	-(HE II)
1 Signal Equipment Engineer	-(HE II)
1 Signal Equipment Field Service Engineer	-(HE I)
1 Signal Equipment Contract Engineer	-(HE I)
2 Signal System Engineers	-(HE I)
5 Signal Optimization Engineers	-(HE I)
1 Signal Equipment Contract Technician	-(ET III)
1 Railway-Highway Grade Crossing Signal Technician	-(ET III)
1 Signal Systems Technician	-(ET III)
2 Signal Equipment Technicians	-(ET II)
1 Traffic Control Shop Supervisor	-(TCSS)
9 Electronic Technicians	-(ELT I)

The Unit is divided into two functional groups: a Signal Systems Squad and a Signal Equipment Squad.

## Organizational Changes

One additional full-time Signal Equipment Technician position was created in the Signal Equipment Squad to assist the Signal Equipment Contracts Engineer's group in the administration of highway-railroad grade crossing projects, management of the signal equipment inventory and review of signal equipment contracts.

## SIGNAL SYSTEMS SQUAD

### Activities:

The Signal Systems Squad consists of 8 Engineers and 6 Technicians structured into 2 Groups: the Signal Systems Group, and the Signal Optimization Group.

The Signal Systems Group is a Group of 3 Engineers and 1 Engineering Technician, and is responsible for the optimization of interconnected traffic signals on the State and the City Street Systems as requested by the Highway Divisions. Primary emphasis is placed on reducing fuel consumption, traffic congestion, and unnecessary delay. The Signal Systems Group obtains recent traffic volume counts and inventories existing intersection characteristics and speeds. The data is then analyzed and new signal timings are determined. The new timing plans are installed in concert with the help of the Highway Division Personnel.

Twenty-nine signal systems were retimed by the Signal Systems Group. Estimates of the reduction in Stops, Delays, and Fuel Consumption indicate an Annual Operating Cost Savings of \$ 86,000 per project. Studies completed by the Signal Systems Group are as follows:

<u>CITY</u>	<u>SYSTEM NAME</u>
Asheboro	US 64 Asheboro Bypass
Asheville	US 70-74 Tunnel Rd at White Pine Dr. System
Burlington	I-85 at NC 49 Ramps Church Between Alamance and Tarleton
Chapel Hill	US 15-501 Bypass
Concord	US 601 Bypass
Durham	NC 54 at SR 1101, SR 1106
Farmville	Farmville CBD
Garner	US 70 at NC 50 Isolated
Greenville	10th St. System US 13, NC11 Memorial Dr.
Jacksonville	Western Blvd. System
Kinston	US 70B - 258 at NC 58, SR 1838; System Analysis Kinston CBD System
Kitty Hawk	US 158 Bypass, Bridge to SR 1200
Mooreville	Mooreville CBD, Extend System Statesville at Oak, Main, Church
Raleigh	US 64-70-401 at SR-1007, Beltline at Poole Rd. US 64 East, New Bern Ave, Hospital to Corporate Blue Ridge Rd. System US 70 Oakpark System
Roxboro	US 501 Bypass System, Madison Blvd.
RTP	NC 54 at SR 1106 and SR 1101
Shelby	Shelby CBD System
Statesville	NC115 at I 40 Ramps
Thomasville	NC 109 System
Walkertown	NC 66 System
Williamston	Williamston CBD
Wilmington	16th-17th St System

Studies for the following projects are in progress:

<u>CITY</u>	<u>SYSTEM NAME</u>
Asheboro	CBD System
Burlington	Burlington CBD System
	US 70 Church St. Sys'. East 6 Signals
Morganton	Morganton CBD System
Raleigh to Garner	US 70-401 South Wilmington St from Pecan
	Six Forks Rd System
	Wake Forest Rd System
Wilmington	Wilmington CBD System

The Signal Optimization Group consists of 5 Engineers and 5 Electronic Technicians who are responsible for the retiming of isolated and interconnected signals state-wide. During 1988, the Group completed the retiming of 584 intersections of which 63 were in interconnected systems. The work resulted in an estimated annual operating cost savings of \$ 14,627,892. Since the commencement of the Federal Energy Contract Program three years ago, 1380 intersections have been retimed for an annual operating cost savings of \$ 68,659,870.

#### SIGNAL EQUIPMENT SQUAD

##### Activities:

The Signal Equipment Squad procures, evaluates, stocks and distributes traffic control equipment. It provides technical assistance to various agencies and administers railroad signal construction projects and maintenance payments to railroad companies for grade crossing maintenance. The squad also evaluates all equipment proposed by vendors. Additionally, the squad reviews all traffic signal equipment selected by the Signals and Geometrics Unit to assure that the equipment proposed can accommodate the developed design. When a special traffic signal function is required, the squad designs necessary circuitry and develops schematics to implement the special function.

During the past year, the squad assisted Division 6 in the construction phase of the City of Fayetteville computerized signal system. The system operational testing is scheduled to begin in early 1989.

Construction of a 47 intersection signal system was begun in Asheville with all equipment on work site. Construction is being done by the City of Asheville. Members of the Signal Management

Unit attended the initial software and hardware demonstration in Santa Clara, California and upon successful demonstration of operation by vendors, authorization was given for shipment.

The planning stage and cost estimate were completed for the Loop Test Site Project. The Loop Test Site Project will provide the unit a method to effectively evaluate the types of loop detectors and materials used to install loops. Scheduled construction is for 1st quarter of 1989.

Member of this unit served in an advisory capacity to the City of Gastonia during development for feasibility study and will continue this relationship during development of Plans, Specs & Estimate (PS&E) which is scheduled for completion by October 1989.

Rehabilitation of the Greensboro computer based signal system was in the TIP for fiscal year 1988. Members of Signal Management Unit served on Consultant Selection Committee, the selected Consultant began the development of PS&E with a date of availability of September 1989. Estimated cost of this project is 3.2 million dollars. The anticipated completion date is 1992.

The feasibility study for rehabilitation and expansion of the city of Raleigh Computer Based Signal System was completed in 1988. Members of Signal Management Unit assisted the city of Raleigh with both consultant selection and feasibility study. In 1988, this unit began the preparation of a municipal agreement between the Department of Transportation and the City of Raleigh for delineation of responsibility and appropriation of funding for project. This project will be completed in 1992 at a cost of approximately 4.4 million dollars.

A training school on the Traconex controller, cabinets and conflict monitors was held by this unit to assist the divisions in learning the new equipment to be purchased from supplementary bid. Over fifty people attended the one week session which covered all aspects of the Traconex controller, conflict monitors, and cabinet wiring.

The squad prepared engineer's estimates and coordinated equipment selection for the replacement of over 500 intersection signal controllers and cabinets in the Urban Upgrade Program in 1988. This program will continue in 1989. Targeted program goals are the replacement of over 2000 controllers and cabinets at a cost of approximately 12 million dollars.

In the area of railroad signal installations, forty-two (42) grade crossing projects were completed during 1988. Inspections were performed on all 42 completed projects. Construction stake-outs were performed at 4 construction sites at the request of the contractors.



Prepared designs and schematics for the replacement of manually operated weigh station signs with electronic changeable message signs for four truck weigh stations in Orange, Surry, Buncombe and Iredell counties.

Sixty-one (61) maintenance inspections were performed on railroad crossings. The squad processed \$455,474 in maintenance payments to the railroads.

In addition to the major projects stated above, the squad worked on the following projects and programs:

- ... Performed 34 inspections of new signal installations and continued to develop policies and procedures for the Traffic Signal Inspection Program for all new installations on the highway system.
- ... Prepared a secondary signal equipment contract, reviewed bids and made recommendations for award to the Division of Purchase and Contracts. Approximately one million dollars worth of signal equipment is purchased from this contract annually.
- ... Designed and prepared 152 electrical details to tailor signal control equipment to the specific needs of the individual intersection.
- ... Reviewed 415 scratch requisitions for new signal installations and upgrades.
- ... Investigated 8 tort claims and prepared reports of findings to the Attorney General Office.
- ... Processed 56 signal equipment requisitions.
- ... Prepared 18 complete electrical details for turn-key contract signal projects.
- ... Reviewed and recommended 18 signal equipment bids for award.
- ... Had 1996 incidents of technical response to Highway Divisions and other agencies.
- ... Developed 8 estimates for signal construction projects.
- ... Processed 163 railroad invoices for payment.

During 1988, the Signal Equipment Squad, at its Central Repair Facility, spent in excess of \$15,000 on replacement parts and spent an excess of \$22,000 on test equipment to better perform repairs.



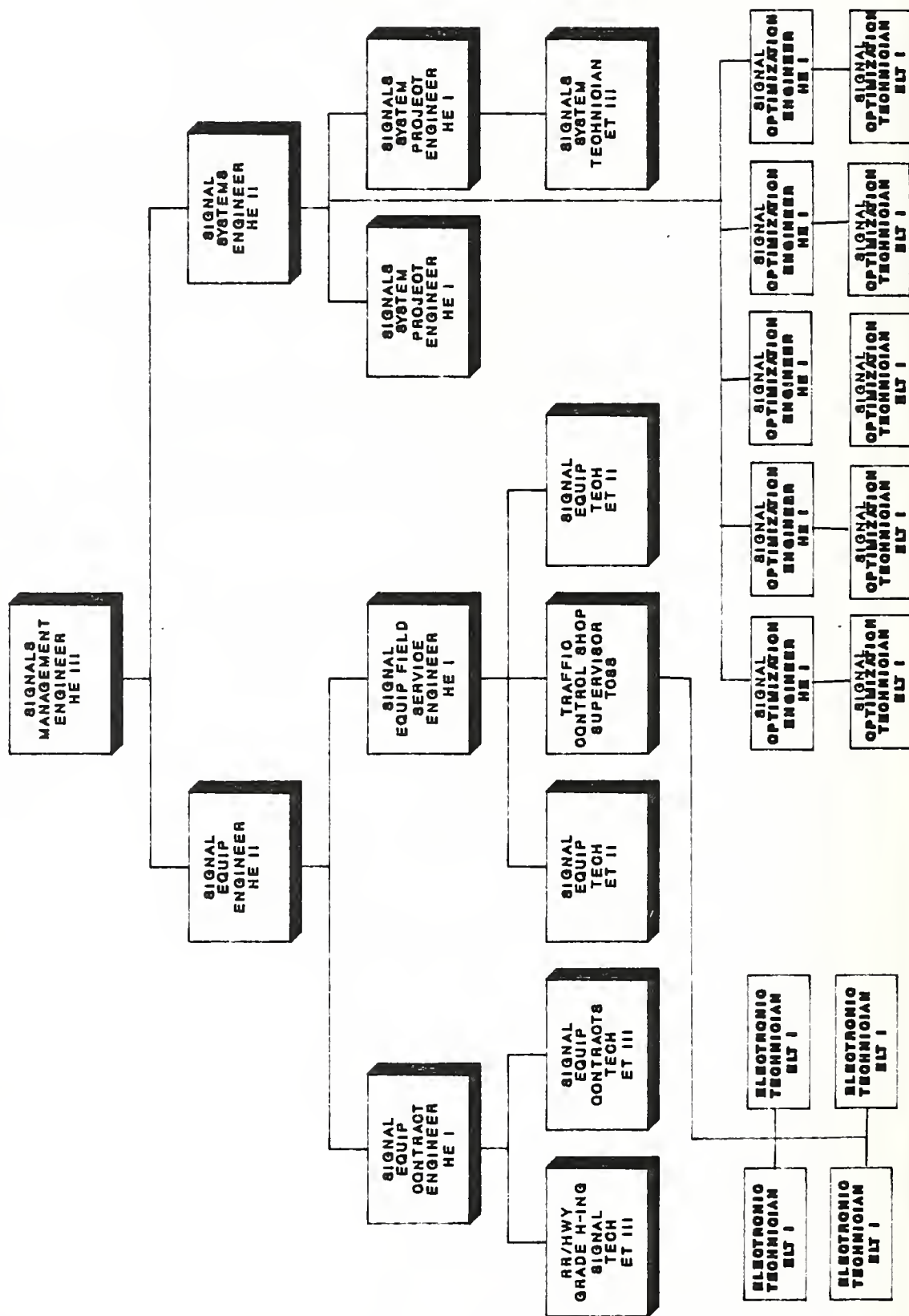
The following is a summary of equipment repaired at the Central Repair Facility:

Equipment Repaired

Solid State controllers	1135
Electromechanical Controllers	566
Accessory Control Equipment	861
Detector Amplifiers	849
Cabinets	6
Field Repairs in Divisions	<u>23</u>
Total:	3440

# SIGNAL MANAGEMENT UNIT

## ORGANIZATION CHART



# TRAFFIC STUDIES UNIT

## Purpose:

The Traffic Studies Unit is responsible for testing and evaluating traffic control and traffic safety devices, new materials and new traffic engineering methods for possible use on the State Highway System; performing special traffic engineering projects and programs; reviewing street and highway construction plans for traffic safety and operations problems; and reviewing special commercial driveway entrance permit applications.

This unit is additionally responsible for performing accident studies to identify hazardous locations which have the greatest potential for accident reductions. Through these studies, highway safety improvement needs, and the effectiveness of installed treatments can be determined.

In addition, the Municipal Traffic Engineering Assistance program was re-started under this Unit to provide traffic engineering services to cities under 50,000 population.

The unit is also responsible for writing and maintaining records of traffic ordinances, primary route changes, and municipal agreements.

## Personnel:

The Traffic Studies Engineer HE III is responsible for supervising the following major functions: Special Projects, Design Review, Accident Studies, and Municipal Traffic Engineering Assistance.

The remainder of the staff is as follows: (1) The Municipal Traffic Engineering Assistance program is handled by an Highway Engineer II, an Highway Engineer I, and an Engineer Technician III. (2) A Highway Engineer II and a Highway Engineer I handle the design review work; (3) The accident studies function is handled by an Accident Studies Engineer II, an Accident Studies Project Engineer I, an Engineering Technician III, three Engineering Technician IIs, one Statistical Research Technician II, one Records Clerk V, and one Clerk-Typist II.

## Organization Changes:

The Accident Studies Squad was reorganized. An Highway Engineer II was added to the Squad as the Accident Studies Engineer. The Engineering Technician III was staffed to the

Accident Studies Squad. The Municipal Traffic Engineering Assistance program was re-started with the addition of three new positions: Highway Engineer II, Highway Engineer I, and an Engineering Technician III.

### SPECIAL PROJECTS

#### Activities:

The Special Projects Function includes a variety of engineering studies, investigations, and reports. Normally, these projects fall into one of the following categories: Traffic Control Devices Evaluation, Pavement Marking Projects, and Administrative Staff Engineering Services.

During 1988, the following Special Projects were conducted:

- ... Conducted pre-qualification tests on sign sheeting for State contract purchasing.
- ... Administered the statewide Section 205 Pavement Marking Demonstration Programs under the Highway Safety Program. Provided technical advice to field staff.
- ... Continued to monitor "Before and After" Spot Speed Studies Summary for the Interstate 65 mph.
- ... Completed the Federal-aid Railroad Grade Crossing Improvement Program list for Transportation Improvement Program.
- ... Coordinated the Annual Traffic Engineering and Traffic Services meetings, prepared the Branch's annual report, and Cost Management reports.
- ... Participated in the feasibility study and implementation of a Geographical Information System for the Division of Highways.

### DESIGN REVIEW

#### Activities:

The Design Review staff reviews special commercial access plans for safety, capacity, and overall traffic operations.

In conjunction with the commercial development access reviews, the Design Review staff also becomes involved in the review of existing and proposed cross-overs, traffic signal analysis and control of access right of ways, that directly or indirectly affect each request for access onto the state maintained system.

The efficiency and safety of a street or highway depends largely upon the amount and character of interference of vehicles moving along the roadway (interference meaning vehicles leaving or crossing the road, or standing nearby.)

In order to protect the traveling public and to fully utilize the potential of the highway investment, it is necessary to regulate the vehicle movements into and out of roadside developments, thus aiding in minimizing the interference with the traffic stream. Driveway traffic accounts for a large percentage of the interruptions to smooth traffic flow. In light of the above, the Design Review staff is concerned with the special review of driveway connections onto the State Highway System. They review design elements of location, spacing, sight distance, throat width, radii angles, declaration lanes, and grades. These elements greatly influence the operating characteristics and level of service on adjacent highways.

The Design Review Function is coordinated with Roadway Design Unit, Planning and Research Branch, Area Traffic Engineers and FHWA when special problems arise during the design stages of special commercial permits.

The Design Review Squad completed the following tasks in 1988:

- ... 162 Special Commercial Driveway Permits were reviewed and completed with a written report submitted to the Division Engineer.
- ... 57 roadway project plans were reviewed in conjunction with the Area Traffic Engineers.

#### ACCIDENT STUDIES

##### Activities:

The Accident Studies staff identifies and selects hazardous locations which have the greatest potential for accident reduction. The staff also maintains and updates railroad grade crossing inventory and location maps. The staff maintains the traffic ordinances, primary route changes and municipal agreements.

This section accomplished the following in 1988:

- ... Completed 1,272 routine and special requests for accident data. Of these requests, 4 were for collision diagrams, 3 were "Before and After" Studies and 1,265 were for other traffic accident studies.

- ... Developed Highway Safety Program locations to be field investigated.
- ... Handled the processing of approval of all Highway Traffic Ordinances on the State Highway System.
- ... Handled the processing of 131 primary route changes.
- ... Continued to monitor twin-trailor and mobile home accidents and prepare periodic reports.
- ... Added 7,710 old traffic ordinances to the new computerized Traffic Ordinances System.
- ... Made presentation on the uses that the Traffic Engineering Branch make of the traffic accident reports and the MERGE Accident Files at five traffic record workshops.
- ... Continued to support the Local MERGE System involving 8 cities and helping with training.
- ... Prepared the following special reports:
  1. Northeast Cape Fear River Bridge
  2. Fatality Rates on NC Rural Secondary Roads
  3. Raleigh Beltline Accidents
  4. Swareflex Reflectors
  5. Red Signs
  6. 65 MPH Study (Preliminary)

#### MUNICIPAL TRAFFIC ENGINEERING ASSISTANCE

##### Activities:

The Municipal Traffic Engineering Assistance Program was reactivated in March 1988 to provide traffic engineering assistance to municipalities in the State on a request basis. There are over 450 municipalities that meet the eligibility criteria of being under 50,000 in population and without traffic engineering capabilities.



Requests for assistance were received from fifteen municipalities and studies were completed in ten of the cities.

- ... 94 block faces and/or parking lots were studied in two cities and recommendations made to improve parking management including fourteen concept designs.
- ... Projects in two cities involved one-way street system studies.
- ... 35 intersections in six different cities were investigated and recommendations made to improve traffic operations and safety characteristics at the locations. Five intersection designs and seven signal designs were provided for implementation by the municipalities.
- ... Some 26 meetings were held with municipal and other involved personnel in assessing problems, planning courses of action, and coordinating data collecting activities.
- ... 11 reports were written detailing appropriate courses of action, justifications, and estimated costs.
- ... 8 formal presentations were given to combined audiences of over 500 citizens, professional staff people and elected local officials.

TRAFFIC STUDIES UNIT

ACTIVITY DESCRIPTION	1984		1985		1986		1987		1988	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
1. Project Plans Reviewed		178		162		125		75		57
2. Regular Driveway Permit Reviews		25		46		15		0		0
3. Special Driveway Permit		161		189		111		155		162
4. Municipal Speed Zone Additions & Deletions	78	149 227	93	108 201	139	119 258	113	261 374	65	394 459
5. Rural Speed Zone Additions & Deletions	346	509 855	409	438 847	908	473 1381	511	908 1419	325	475 800
6. Other Additions & Deletions	752	857 1609	636	710 1346	636	596 1232	511	804 1315	964	1398 2362
7. Old Ordinances Added to the Computerized Ordinances System									0	7710 7710
8. Collision Diagrams	75	128 203	10	71 81	2	17 19	29	28 57	3	1 4
9. Before and After Studies Prepared	30	137 167	37	40 77	29	11 40	12	10 22	3	1 4
10. Rates Calculated for Tentative Safety Program	765	0 765	746	0 746	324	419 743	0	0 0	83	771 954
11. Other Accident Studies Prepared	454	344 798	554	519 1073	539	746 1285	1224	757 1981	730	535 1265
12. Signal/Geometric Designs									5	7 12
13. Intersection Investigations									20	15 35

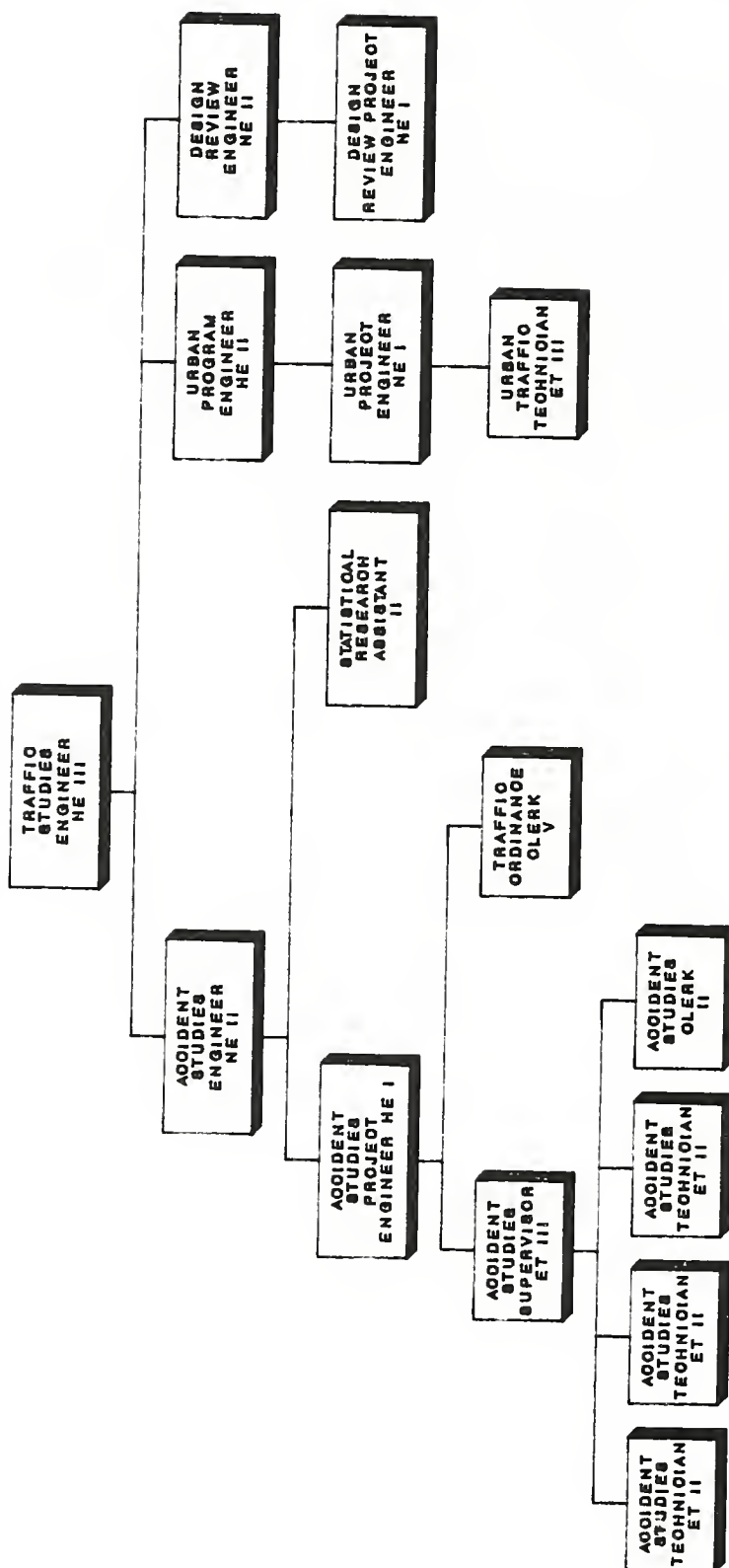


TRAFFIC STUDIES UNIT

ACTIVITY DESCRIPTION	1984		1985		1986		1987		1988	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
14. Traffic Studies									3	7
										10
15. Meetings									10	16
										26
16. Reports Written									2	9
										11
17. Presentations									2	6
										8
18. Parking Studies									1	1
										2
19. Other Studies									1	4
										5

# TRAFFIC STUDIES UNIT

## TRAFFIC ENGINEERING BRANCH



## ORGANIZATION CHART

## FIELD SUPPORT SQUAD

### PURPOSE:

The purpose of the Field Support Squad is to provide staff engineering assistance to the Assistant State Traffic Engineer - Field Operations. This squad coordinates the Spot safety program, the Federal-aid Hazard Elimination Program for the TIP, and the handling of requests received from the public and other sources related to traffic engineering matters.

### PERSONNEL:

This squad consists of the Field Support Engineer (HE II), Field Support Technician (ET I), and the Traffic Records Clerk (Clerk III).

### ORGANIZATIONAL CHANGES:

The Field Support Technician position was added during 1988 to provide engineering assistance to the Field Support Squad.

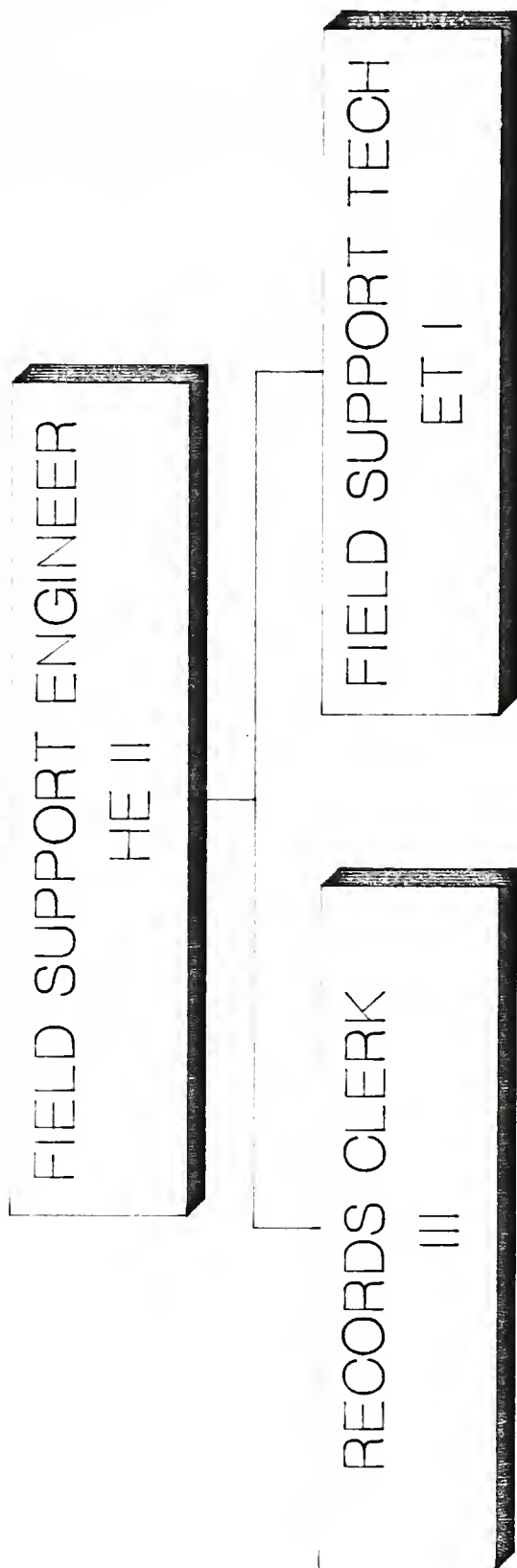
### ACTIVITIES:

This squad prepared the monthly Spot Safety Program for submittal to the Board of Transportation for approval, prepared monthly reports on the status of the Spot Safety Program for the Board of Transportation and Division of Highways Administrative staff, prepared the Federal-aid Hazard Elimination Program section of the Transportation Improvement Program, administered requests, complaints, and suggestions received by the Traffic Engineering Branch related to field operations matters.

# FIELD SUPPORT SQUAD

ACTIVITY DESCRIPTION	1984		1985		1986		1987		1988	
	JAN. -JUN	JULY -DEC. (TOTAL)	JAN. -JUN	JULY -DEC. (TOTAL)	JAN. -JUN	JULY -DEC. (TOTAL)	JAN. -JUN	JULY -DEC. (TOTAL)	JAN. -JUN	JULY -DEC. (TOTAL)
1. Requests Logged IN	295	331 626	306	332 638	304	270 574	267	262 529	300	260 560
2. Traffic Volumes Requested	270	261 531	339	312 651	658	312 970	87	189 276	307	377 684
3. Work Orders Processed	97	90 187	74	141 215	122	178 300	151	163 314	99	179 278

# FIELD SUPPORT SQUAD



## ORGANIZATION CHART

# AREA TRAFFIC ENGINEERING UNITS

## Purpose:

The Area Traffic Engineering Units are responsible for investigating and implementing safety programs; investigating and processing requests and complaints regarding traffic matters on State Highways; and providing traffic engineering services on a statewide basis through the five Area Traffic Engineering offices (that coordinate with the 14 Division Traffic Engineers). Some of the detailed responsibilities of these Area Traffic Engineers are:

- ... Investigating accident locations and recommending treatment to eliminate safety hazards; and investigating fatal traffic accident sites to determine if immediate safety improvement measures are required.
- ... Formulating safety improvement projects for possible future funding through any available Highway Safety Programs.
- ... Providing accident data when requested.
- ... Investigating and reporting information regarding traffic accidents involving roadway safety design features (i.e. breakaway sign supports, guardrail terminal sections, crash attenuators, etc.).
- ... Providing information regarding FHSA improvement locations, N.C. DOT's Safety Program, etc.
- ... Review project plans for traffic control devices and safety design features, etc.

## Personnel:

Each of the Area Traffic Engineering units consists of an Area Traffic Engineer (HE III) and an Assistant Area Traffic Engineer (HE II) with an office located strategically within their area.

## Organization Changes:

During 1988 the number of Area Traffic Engineering units increased from three to five as described above. Prior to the change, Area One, located in Wilson, was responsible for Divisions 1 thru 5. Area Two, located in Winston-Salem, was

responsible for Divisions 6 thru 10. Area Three, located in Asheville, was responsible for Divisions 11 thru 14. Satellite offices, manned by Assistant Area Traffic Engineers, were located in Durham and Fayetteville.

These five Areas are assigned the 14 Divisions in the following manner:

Area 1 Consists of Divisions 1, 2, and 4 with the main office located in Wilson.

Area 2 Consists of Divisions 5 and 7 with the main office located in Durham.

AREA 3 Consists of Divisions 3, 6, and 8 with the main office located in Fayetteville.

AREA 4 Consists of Divisions 9, 10, and 11 with the main office located in Winston-Salem.

AREA 5 Consists of Divisions 12, 13, and 14 with the main office located in Asheville.



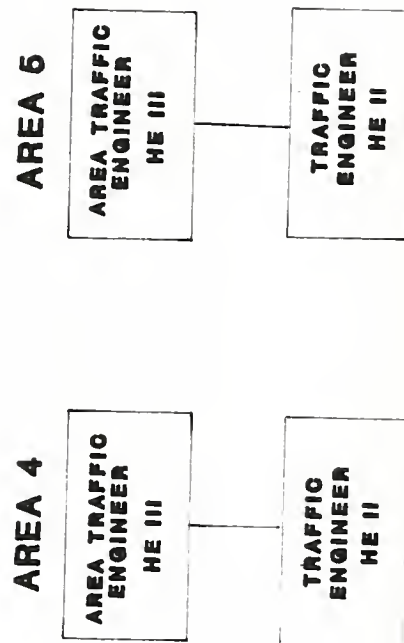
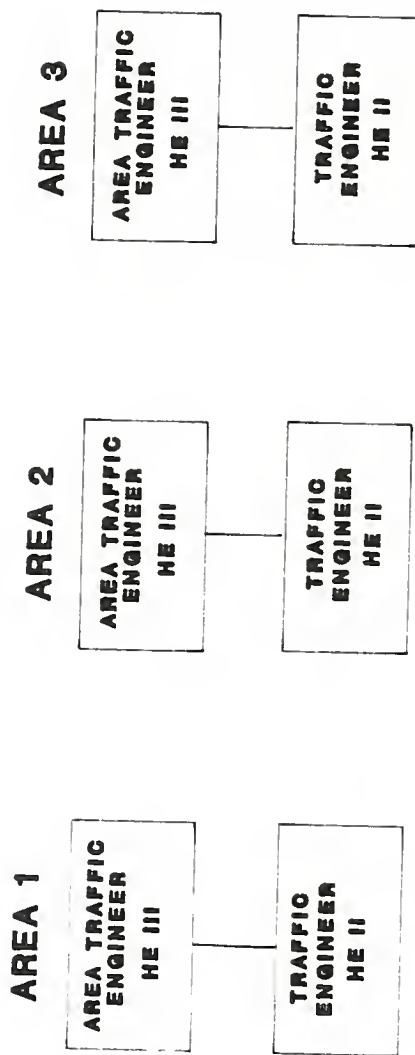
# Area Traffic Engineering Units

ACTIVITY DESCRIPTION	AREA 1			AREA 2			AREA 3			AREA 4			AREA 5		
	JAN.	JULY	TOTAL	JAN.	JULY	TOTAL	JAN.	JULY	TOTAL	JAN.	JULY	TOTAL	JAN.	JULY	TOTAL
	-JUNE	-DEC		-JUNE	-DEC		-JUNE	-DEC		-JUNE	-DEC		-JUNE	-DEC	
1. Urban Speed Zones	34	32	66	15	18	33	6	6	12	38	9	47	21	32	53
2. Rural Speed Zones	37	31	68	16	38	54	4	6	10	42	59	101	42	58	100
3. School Investigations (Cross-speed zones, etc.)	15	10	25	15	11	26	4	9	13	2	2	4	5	4	9
4. Intersection Studies	45	65	110	56	72	128	23	21	44	28	8	36	7	16	23
5. Regulatory Signs	21	31	52	16	23	39	19	16	35	4	0	4	5	13	18
6. Guide Sign Investigations	5	18	23	31	40	71	12	8	20	25	71	96	12	16	28
7. Warning Signing Investigations	15	80	95	24	19	43	3	3	6	8	5	13	11	17	28
8. Plan Reviews	46	43	89	16	27	43	9	15	24	16	19	35	12	23	35
9. Crossover Investigations	30	35	65	7	5	12	2	3	5	13	9	22	7	2	9
10. Route Changes	4	3	7	1	2	3	6	5	11	1	3	4	2	0	2
11. Hazardous Location Investigations Non-Safety Program	21	38	59	37	48	85	6	2	8	2	1	3	2	5	7
12. Special Commercial Driveway Permit Review	42	28	70	11	14	25	5	4	9	8	12	20	18	16	34
13. Rural Safety Program Investigations	20	17	37	11	4	15	3	0	3	0	0	0	5	10	15
14. Urban Safety Program Inventory	18	20	38	14	10	24	2	2	4	0	28	28	2	48	50
15. Railroad Crossing Studies	56	39	95	32	17	49	45	1	46	20	43	63	24	15	39
16. Encroachment Contracts	0	0	0	0	0	0	2	1	3	7	5	12	4	0	4
17. Traffic Signal Investigations	90	74	164	87	95	182	23	21	44	55	48	103	41	24	65
18. Pavement Marking Investigatns	71	44	115	26	22	48	0	0	0	7	10	17	7	8	15
19. Other Field Investigations	67	68	135	22	47	69	6	5	11	13	17	30	22	23	45
20. Fatal Accident Locat. Studies	56	47	103	12	15	27	13	10	23	19	165	184	42	51	93
21. Pavement Marking Studies	35	44	79	0	0	0	0	2	2	0	0	0	1	0	1

Area Traffic Engineering Units

ACTIVITY DESCRIPTION	AREA 1			AREA 2			AREA 3			AREA 4			AREA 5		
	JAN.	JULY		JAN.	JULY		JAN.	JULY		JAN.	JULY		JAN.	JULY	
	-JUNE	-DEC	TOTAL	-JUNE	-DEC	TOTAL	-JUNE	-DEC	TOTAL	-JUNE	-DEC	TOTAL	-JUNE	-DEC	TOTAL
22. Channelization	10	28	38	4	6	10	3	2	5	0	0	0	1	0	1
23. Breakaway Signs, Guardrail, Accidents, etc.	3	8	11	2	0	2	0	0	0	0	0	0	0	0	0
24. Curve Delineation Studies	6	7	13	0	0	0	0	0	0	0	0	0	3	0	3
25. Truck Route & Spot Speed Studies	60	40	100	21	21	42	0	0	0	5	15	20	5	13	18
26. Special Events (foot, bike, boat races, etc.)	2	3	5	0	0	0	4	3	7	1	0	1	4	0	4

# AREA TRAFFIC ENGINEERING UNITS



## ORGANIZATION CHART

# PROFESSIONAL ACTIVITIES

By encouraging its personnel to participate in professional activities and to work toward professional and educational advancement, the Traffic Engineering Branch hopes to cultivate individual professionalism and thereby develop the full potential of the organization.

During this year, Traffic Engineering Branch personnel served on the following committees and/or offices:

- HP&R Study Steering Committee
- NC DOT - CADD User Group Committee
- Traffic Control Task Force- 1990 Standard Specifications Book
- Traffic Control Roadway Standard/Typical Task Force
- Traffic Control Performance Appraisal Review (PAR) Task Force
- "1988" Buford Smith Award
- NC DOT - I-40 Task Force
- Policy Implementation Committee
- New Products Committee
- Pavement Design Committee
- Letting List Committee
- Contract Time Committee
- SCSA Membership Chairman
- NCSSITE - Affiliate Director
- CADD Steering Committee
- CADD Expansion Committee
- NCDSSITE - President
- MERGE Advisor Committee
- Traffic Records Advisor Committee
- Bike Task Force - Co-Chairman

Additionally, branch personnel participated in the following professional meetings and conferences:

- HP&R Steering Committee Meeting
- Construction Engineers Conference
- Southeastern Geotechnical Conference
- ARTBA - Florida "Performance Spec Presentation"
- AASHTO - Florida "Performance Spec Presentation"
- Traffic Services Supervisor's Meeting
- Contractor\Engineers Conference
- NC DOT Maintenance Conference - Guest Speaker
- ITE Annual Meeting
- Retirement Meeting

TE\TS Meeting  
Motorist's Services Conference  
International Accident Records Forum  
Merge Meeting  
GIS Meeting  
Traffic Records Meeting  
ITE PC Users Group Meetings  
HOV National Conference

In order to maintain their professional standing and effectiveness, the following seminars and training activities were attended:

Highway Capacity Analysis Workshop  
FHWA Construction Zone Traffic Control Seminar  
Stress Management Workshop  
FHWA Traffic Capacity Workshop  
EIT Exam Review  
Tort Liability For Traffic and Transportation Engineers  
PE Exam Review  
Highway Engineering Concepts Course  
TRIP Generation Seminar - ITRE  
Performance Appraisal Review (PAR) Training Course  
Fred Pryor Management Training Seminar  
Fred Pryor "How To Supervise People" Seminar  
Fundamentals Of Management Curriculum  
FHWA "Design and Operation of Work Zone Traffic Control Workshop" - Guest Speaker  
NC DOT Personnel Management  
Corporate Tie Training Course  
Managing In A Changing Environment  
Management in Local Public Works  
Traffic Signal Workshop - GTU  
Capacity and Planning Applications for Arterial Analysis  
Railroad-Highway Grade Crossing Training Course  
Isolated Signals Course  
Systems Signals Course  
Signal Design Course  
ITRE TRIP Generation Course - Instructor  
Management Assessment Program  
Data Base III  
Traffic Operations Reviews  
Introduction to Microcomputers  
Getting Your Message Understood  
P.E. Review  
Traffic Engineer Seminar  
Traffic Records Workshop  
Lotus 1-2-3  
Grade Specific Signing Workshop  
SAS/MERGE Workshop  
F.H.W.A. R/R Course  
GIS Training Course

REGISTERED PROFESSIONAL ENGINEERS  
IN  
TRAFFIC ENGINEERING BRANCH

Bivens, N.R.  
Blount, E.B.  
Canales, R.  
Crowe, Jr., N.C.  
Deaver, P.G.  
Garner, W.C.  
Gettier, G.L.  
Goode, Jr., C.B.  
Grigg, Jr., G.G.  
Kimley, R.J.  
Lynch, J.M.  
Mallard, E.F.

Milam, K.E.  
Permar, J.F.  
Robertson, D.W.  
Sessoms, Jr., C.C.  
Smart, W.D.  
Staley, W.B.  
Stallings, L.N.  
Steelman, H.M.  
Watson, W.J.  
White, W.J.  
Williams, L.T.

CERTIFIED ENGINEERING TECHNICIANS

Kellenberger, J.W.

PROFESSIONAL ORGANIZATION MEMBERSHIPS

NAME	ITE	SSITE	NCSSITE	NSPE	PENC	REC	ASCE	NCSASCE	ASCET
Beard, K.C.			M						
Bivens, N.R., P.E., RLS			AF						
Blount, E.B., P.E., RLS *	F	M	M	M	M	M			
Bourne, J.S.	AF								
Braswell, W.M.			AF						
Canales, R., P.E.	AF		M						
Cole, C.R.							M		
Crowe, Jr., N.C., P.E.	M	M	M						
Deaver, P.G., P.E., RLS			AF						
Eddins, L.M.			AF						
Evans, C.L.			AF						
Faulkner, G.C.			AF						
Gettier, G.L., P.E.			AF						
Grigg, Jr., G.G., P.E.		AF							
Harris, T.A.			AF						
Harrison, M.W.			AF						
Jeffreys, T.			AF						
Justice, H.A.		M	M						
Kellenberger, J.W.			AF						M
Kelly, C.L.							M		
Kilmley, R.J., P.E.	L	M	M	M	M	M	L	M	
Lorscheider, A.R.			M						
Lynch, J.M., P.E.	F	M	M				M	M	
Montgomery, J.H.			AF						
Oldham, M.W.			AF						
Peoples, T.	M	M	M						
Robertson, D.W., P.E. **	A	M	M	M	M		M	M	
Rosendahl, J.F.	M	M	M						
Sessions, Jr., C.C., P.E.		PAF	AF						
Smith, S.K.			AF						
Stamp, J.L.		PAF	AF						
Stanley, D.			AF						
Sultan, O.S.			AF						
Turner, C.S.	AF	PAF		M			M		
Varon, G.E.							M		
Watson, W.J., P.E.	M	M	M						
Webb, D.W.	A	M	M						
White, W.J., P.E.			AF						
Williams, L.T.	F	M	M	M	M				
Wyatt, T.			AF						

\* NSCE also.

\*\* NCLUC, NCPTA, & SCSA also.



Abbreviations for the above organizations:

ASCE - American Society of Civil Engineers  
NCSASCE - N.C. Section of the American Society of Civil Engineers  
ITE - Institute of Transportation Engineers  
NCDSSITE - North Carolina Division of the Southern Section of  
Institute of Transportation Engineers  
NCPTA - North Carolina Public Transportation Association, Inc.  
NSPE - National Society of Professional Engineers  
PE - Registered Professional Engineer  
PENC - Professional Engineers of North Carolina  
RLS - Registered Land Surveyor  
SSITE - Southern Section Institute of Transportation Engineers  
SCSA - Soil Conservation Society of America

L - Life	M - Member	AF - Affilliate
F - Fellow	A - Associate Member	PAF - Professional

We are proud of the wealth of experience in the field of Traffic Engineering possessed by our staff.

We are also proud of these employees who have been a part of our Traffic Engineering family for so many years.

#### YEARS OF SERVICE IN TRAFFIC ENGINEERING BRANCH

30+ Years -----	15+ years -----	5+ Years -----
Blount, E.B.	Daniels, S.	Andrews, C.F.
-----	Eddins, L.M.	Bailey, L.H.
25+ Years -----	Evans, T. M.	Braswell, W.M.
Deaver, P.G.	Gettier, G.L.	Canales, R.
Justice, H.A.	Goode, Jr., C.B.	Cranford, J.C.
Sessoms, Jr., C.C.	Holland, S.L.	Glover, C.
Stamp, J.L.	Johnson, B.R.	Hoyle, J.C.
Wilkins, J.R.	Kellenberger, J.W.	Sellew, J.E.
-----	Mallard, E.F.	Whitfield, Jr., W.A.
20+ years -----	Murray, F.A.	
	Oldham, M.W.	
	Parker, G.E.	
	Peoples, T.A.	
	Stanley, D.G.	
	Todd, I.G.	
Baker, D.H.		
Bivens, N.R.		
Butler, E.B.		
Cauley, R.E.		
Crowe, Jr., N.C.		
Grigg, G.G.	-----	
Harris, T.	10+ Years	
Jeffreys, T.	-----	
Lynch, J.M.	Dix, S.B.	
Milam, K.E.	Kimley, R.J.	
Moody, S.E.		
Oldham, M.W.		
Permar, J.F.		
Rosendahl, J.F.		
Smith, S.K.		
Stafford, Jr., E.Y.		
Stallings, L.N.		
Steelman, Jr., H.M.		
Watson, W.J.		
Webb, D.W.		
Webber, Jr., R.L.		
Williams, L.T.		

# AWARDS

## STRIVING FOR EXCELLENCE

The Traffic Engineering Branch was awarded a plaque titled "Striving for Excellence" for 1987 - 1988. This award was for the money saved in North Carolina for the application of alkyd thermoplastic (long-life) pavement marking instead of the hydrocarbon thermoplastic (long-life) pavement markings on various projects. The alkyd thermoplastics can be placed immediately behind the paver in a paving operation, whereas the hydrocarbon thermoplastic requires the placement of painted pavement markings to maintain traffic during the 15-day interim period from the time of the paving operation to the time the hydrocarbon thermoplastic can be placed. This cost saving project was submitted by the Traffic Control Unit.

# RESOLUTION

## North Carolina Department of Transportation

### RESOLUTION OF APPRECIATION

WHEREAS, highway planning, design, right of way purchase, traffic management, and support functions are essential to continued good transportation in North Carolina; and

WHEREAS, the Division of Highways Preconstruction Branch Managers, Unit Heads, and their personnel perform the complex functions of planning, designing, and implementing highway projects in the TIP; and

WHEREAS, these Preconstruction Branch Managers, Unit Heads, and their personnel worked diligently to accomplish over 92% delivery of the TIP right of way plans on schedule, and projects let on schedule in each of the past two years; and

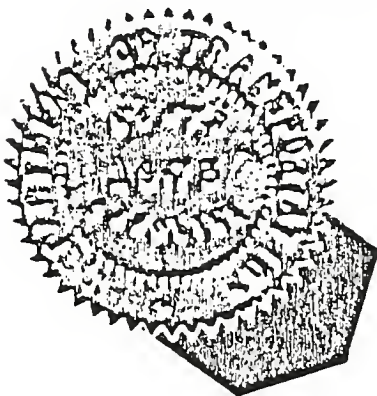
WHEREAS, the efforts of these dedicated professionals resulted in the most reliable Highway Program in the history of the Department and generated public trust and confidence in DOT; and

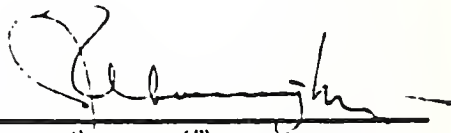
WHEREAS, these employees made the additional effort to advance projects ahead of schedule to gain full advantage of extra funding opportunities; and

WHEREAS, through their special attention to cost-conscious planning and design, and cost monitoring and control, a record annual cost avoidance of \$25,000,000 was attained in the Department's 1987-1988 cost management program;

NOW, THEREFORE, BE IT RESOLVED that the Board of Transportation does commend the Division of Highways Preconstruction Branch Managers, Unit Heads, and their personnel for outstanding service to the State of North Carolina.

This the 14th day of October, 1988.



  
Secretary of Transportation

STATE LIBRARY OF NORTH CAROLINA



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